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09/845,349	05/01/2001	Hirotomo Ishii	018775-827	2588

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EXAMINER	
LAROSE, COLIN M	
ART UNIT	PAPER NUMBER
2624	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/845,349	ISHII, HIROTOMO	
	Examiner	Art Unit	
	Colin M. LaRose	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 22-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-10,12 and 22-24* is/are rejected.

7)☒ Claim(s) *5 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Arguments and Amendments

1. Applicant's arguments and amendments dated 11 January 2007, have been entered and made of record.

Response to Amendments and Arguments

2. Regarding claims 1, 2, 6-8, 12, and 22-24, Applicant asserts that Huang does not disclose or suggest the claimed "first condition." That is, Applicant argues that Huang does not subsample the inputted image and therefore does store a "first condition on absolute positions of pixels in the image."

Applicant correctly recognizes that Huang's pixel buffer pipe 42 (figure 4) is operative to subsample the input image data 21 to a predetermined resolution (see Remarks 1/11/07, p. 8).

Applicant then points out that column 6/55-58 of Huang teaches that "a current scanline of the input image data 21" is processed to determine the threshold, suggesting that the determination shown in figure 5 is performed on the "as-received" input image data 21 rather than *subsampled* input image data 21. Examiner respectfully disagrees with this interpretation since it does not appear to be correct when considering figure 4 as a whole.

It is undisputed that the pixel buffer pipe 42 subsamples the input image data 21 to a lower resolution based on either a magnification (reduction) factor 49 or a desired resolution 48.

Then, as shown in figure 4, the subsampled input image data is sent from the pixel buffer pipe 42 to the thresholding binary buffer 43. The thresholding binary buffer 43 receives the threshold from the threshold determining unit 45 and uses it to threshold the current pixel of the

subsampled image data, thereby determining whether the current pixel is a "foreground" or "background" pixel (see column 7/20-37).

Next, based on whether the current pixel is determined to be a foreground or background pixel, a feedback signal 53 is sent to the threshold determining unit 45. The feedback signal 53 indicates whether to "hold" the threshold value as it is, or "release" the threshold value, thereby allowing it to dynamically change based on the average of the lag pixels (see column 7/37-47; see also column 7/12-13: "the foreground threshold value is preferably a linear function of the average values of the lag pixels").

In sum, the thresholding binary buffer 43 performs a thresholding operation on the subsampled image data and sends a feedback signal to the threshold determining unit indicating whether to "hold" or "release" the foreground threshold. The question then becomes whether the threshold determining unit 45 derives the threshold from the "as-received" input image data 21, as alleged by the Applicant, or from the "subsampled" input image data 21, as maintained by the Examiner. It is believed that the latter interpretation is the most plausible.

If the thresholding binary buffer 43 and the threshold determining unit 45 were operating on the same image data at different resolutions—i.e., unit 43 operates on the subsampled data, while unit 45 operates on the as-received image data—it seems that such an unintuitive modus operandi would have been unambiguously expressed by Huang. There is no apparent reason identified by Huang as to why or how the two units would operate on the image data at different resolutions. The Examiner believes that this is not the intended operation of units 43 and 45. Rather, it seems that the most logical reading of Huang's description of figure 4 is that the pixel buffer pipe 42 performs a subsampling operation on the inputted image data as a preprocessing

step and utilizes such subsampled data in subsequent operations related to determining and using the threshold.

In column 6/19-49, Huang describes how the pixel buffer pipe 42 receives subsampling signals and performs subsampling of the image data based on the received signals. Then, at column 6/50-45, Huang teaches that in addition to the subsampling of the inputted image data 21, the pixel buffer pipe is also used in the dynamic determination of the threshold values. The order of discussion suggests that the subsampling is performed first, and then *additionally*, or *subsequently*, the pixel buffer pipe is also used in determining the thresholds. The scanline of pixels shown in figure 5, from which the threshold is determined by unit 45, is understood to represent a scanline of pixels after having been subsampled. Although Huang does not explicitly refer to the line of pixels in figure 5 as having been "subsampled," it is evident from the context provided in column 6 and the assumed correspondence of image data processed by the threshold determining unit 45 and the thresholding binary buffer 43 that the scanline of pixels shown in figure 5 to be used for determining the threshold denotes a line of pixels after subsampling.

3. Regarding claims 4 and 10, Applicant asserts that there is no motivation to combine Huang and Bloomberg to achieve the claimed invention since Bloomberg is not related to Huang. Examiner disagrees with this assertion since Bloomberg was only relied upon for the narrow teachings pertaining to the details of how to subsample an image.

As pointed out in the previous Office action, Huang discloses subsampling the image in order to generate a reduced resolution version of the original. See block 41, figure 4. As Bloomberg teaches, the operation of subsampling is well-known in the art and entails

transforming an image by selecting a subset of pixels contained in the image. The resulting set of pixels constitutes a reduced version of the original image. For example, subsampling the image by discarding every second pixel would reduce the image in half; discarding every third pixel would reduce the image by a third; and etc. As in conventional in subsampling, the maintained pixels are spaced at regular intervals throughout the image. It can therefore be said that the absolute positions of the maintained pixels are fixed with respect to the edge of the image; the positions of the maintained pixels do not depend on the location of target pixels or the like – the pixel positions are fixed and spaced at regular intervals.

This is in accordance with Applicant's depiction of pixels satisfying an absolute condition in figure 5 of the present invention. In figure 5, every third pixel is denoted as meeting the "absolute positional condition"; this is equivalent to subsampling the image to a third of its original size because only a third of the original pixels are kept. Thus, it can be seen that Applicant's "absolute condition," as claimed, directly corresponds to Huang's subsampling operation.

4. Reagrding claims 3 and 9, Applicant asserts that Kanno does not overcome the deficiencies of Huang for the base claims, however, as explained above, Huang is considered to anticipate independent claims 1, 8, and 12.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 6-8, 12, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,766,056 by Huang et al. ("Huang").

Regarding claims 1, 8, and 12, Huang discloses an image processing apparatus/medium/method (12, figure 1) comprising:

an input unit (scanner 11, figure 1) for inputting image data of an image composed of a plurality of pixels, each having a color data (color image data is input to the pixel buffer pipe 42 via an input device; column 6, lines 19-21);

a storage unit (42, figure 4) for storing a first condition on absolute positions of pixels in the image and a second condition on positions of pixels relative to a target pixel (first condition: the pixel buffer pipe receive subsampling signals from the sub-sample control module 41 and subsamples the image based on those signals; the resulting image is a down-sampled version of the original that contains only a subset of the original pixels; the pixels to be retained after subsampling constitute the first condition on absolute positions of pixels in the image; see column 6, lines 22-30 and 50-54; second condition: in figure 5, a number of "lag" pixels relative to a target pixel ("0") are identified; the designation of these pixels constitutes the second condition on positions of pixels relative to a target pixel; see column 6, lines 55-67);

a binarization unit (elements 43, 44, and 48, figure 4) for binarizing the target pixel into one of two data values based upon a color data of the target pixel (i.e. color value of the target pixel is compared to threshold during the binarization process) and that of at least one related

pixel to the target pixel in the image (i.e. related pixels are used to generate the threshold) to generate a binarized value (binarized value 54A is output by the pixel count accumulator 48), the at least one related pixel satisfying the first and second conditions stored in said storage unit (column 7, lines 5-25: the threshold for binarizing the target pixel is generated based on the related (lag) pixels, which must satisfy the first and second conditions – that is, the related pixels are present in the subsampled image (absolute condition), and they meet the condition of being "lag" pixels); and

a determination unit (22, figure 2) for determining whether or not the image has a specified pattern, based upon binarized values obtained by said binarization unit (i.e. the mark detection module 22 determines whether a specified patterns exists).

Regarding claim 2, Huang discloses the binarization unit obtains a color data for binarization based upon the color data of the target pixel and that of the at least one related pixel (column 7, lines 12-31: the "color data" obtained for binarization includes the pixel value of the target pixel, and a color threshold that is based on the related pixels), and generates the binarized value based upon whether or not the value indicated by the color data for binarization is within a predetermined range (column 7, lines 20-31 the 3-bit binarized value of the target pixel is generated based upon whether the target pixel's color value is within the color range for a designated mark -- this 3-bit binarized value is then used to generate a binarized value 54A composed of a single bit).

Regarding claim 6, Huang discloses the determination unit determines whether or not an image element having a shape similar to the specified pattern exists, based upon the binarized

values, and when the image element is determined to exist, finely examines the shape of the image element to determine whether or not the specified pattern exists (column 12, lines 42-55: the mark detector detects circle patterns, and then finely examines those circle patterns by gathering statistical parameters).

Regarding claim 7, Huang discloses that when the image element is determined to exist, the determination unit inhibits to generate an image resembling closely the image received from the input unit (column 21, lines 45-52: e.g. photocopier functions are disabled upon detecting the image element).

Regarding claims 22-24, Huang's subsampling results in maintaining pixels in the image that are spaced at regular intervals (i.e. fixed with respect to an edge of the image), as is found in conventional subsampling.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of U.S. Patent 5,434,953 by Bloomberg.

Regarding claims 4 and 10, Huang discloses subsampling the image in order to reduce the image size, thereby defining a first condition (column 6, lines 22-30), and Huang also

discloses a pixel which exists in a straight line including the target pixel extending in the predetermined direction and which is positioned within a predetermined range from the target pixel is the pixel defined in the second condition (figure 5: "lag" pixels, which are positioned within a predetermined range from the target, define the second condition).

Huang does not expressly disclose that every N pixel from a pixel at an edge of the image in a predetermined direction within the image is the pixel defined in the first condition.

However, at the time the invention was made, it was obvious to one skilled in the art that subsampling was typically effected by maintaining every Nth pixel from the edge of the original image in a predetermined direction (e.g. horizontal and vertical directions). Bloomberg teaches that "subsampling" is an operation that involves dividing an image into square blocks of pixels and then selecting a predetermined pixel from each block. The subsampled image is formed by combining each of the selected pixels, resulting in an image that includes every Nth pixel from the original image. Col. 4, lines 8-14. In view of Bloomberg's definition of "subsampling," whose skilled in the art would have known that Huang's subsampling constitutes maintaining every N pixel from the edge of the image in a predetermined direction within the image.

9. Claims 3 and 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of U.S. Patent 5,687,252 by Kanno et al. ("Kanno").

Regarding claim 9, Huang discloses the binarization step includes:

obtaining a color data for binarization based upon the color data of the target pixel and that of the at least one related pixel (column 7, lines 12-31: the "color data" obtained for

binarization includes the pixel value of the target pixel, and a color threshold that is based on the related pixels), and

generating the binarized value based upon whether or not the value indicated by the color data for binarization is within a predetermined range (column 7, lines 20-31 the binarized value of the target pixel is generated based upon whether the target pixel's color value is within the color range for a designated mark).

Regarding claim 3 and further in regards to claim 9, Huang does not disclose the color data for binarization is obtained based upon an average value between the value of the color data of the target pixel and that of the at least one related pixel.

Rather, Huang discloses that the threshold is obtained based on only the related (lag) pixels.

Kanno discloses an image processing system that includes the binarization of image data, similar to the system of Huang. In particular, Kanno discloses a number of different binarization processes that may be carried out in order to binarize image data (column 4, lines 1-13). Method (5) involves calculating a threshold based on average values of both a target pixel and related pixels (see figure 9 and column 9, lines 65+). The average value of the target pixel and its related pixels within a predetermined range is then used as a threshold for binarizing the target pixel.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Huang by Kanno to include the target pixel in the calculation of the average value to be used as the threshold, since Kanno shows that calculating the average value based on both the target pixel and related pixels for the purposes of generating a threshold for binarization of a single target pixel is conventional.

Allowable Subject Matter

10. Claims 5 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 5 and 11, Huang is silent to storing a third condition defining a position relative to the target pixel in a predetermined direction specified by a user, and wherein the at least one related pixel includes a pixel satisfying the third condition. Huang's system does not appear to involve any user interaction for specifying a predetermined direction corresponding to a third condition defining a position relative to the target pixel, as claimed.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (571) 272-7423. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu, can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Colin LaRose
Group Art Unit 2624
2 April 2007